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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,074	10/30/2003	Karl-Friedrich Becker	S&ZFH031002	9160

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EXAMINER
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KEBEDE, BROOK

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/698,074

Applicant(s)

BECKER ET AL.

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,5 and 8-18 is/are rejected.  
7) ☒ Claim(s) 2-4,6 and 7 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/30/09  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicants' election without traverse of Species I, i.e., claims 1-18, in the reply filed on March 14, 2005 is acknowledged.

Accordingly, claim 19 and 20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on March 14, 2005.

### *Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Objections*

3. Claims 7 and 12 are objected to because of the following informalities:

Claim 7 recites the limitation "The method of claim 2, wherein the protection arrangement includes a film, a delaminable layer applied to the contacts, or a portion of the injection mold" in lines 1-4. However, the recited claim contains improper Markush group. It is improper to use the term "comprising" instead of "consisting of" See *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). In this case, "includes" is analogous to "comprising." Appropriate correction is required.

Claim 12 recites the limitation "The method of claim 11, wherein the functional structure is selected from the group including a recess, a V-notch, and a protrusion" in lines 1-3. . However, the recited claim contains improper Markush group. It is improper to use the term "comprising" instead of "consisting of" See *Ex parte Dotter*, 12 USPQ 382 (Bd. App. 1931). Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation “The method of claim 1, wherein the injection molding is conducted such that the surface of the encapsulation material is **flush** with the surface of the contacts after injection molding” in lines 1-3. However, the recited claim lacks clarity in its meaning and scope because it is not clear how the encapsulation material and the surface of the contacts can be exposed (i.e., flushed) during the injection molding and after the injection molding. Therefore, the claim is indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Accordingly, claim 5 has not been rejected over the prior art because, in light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of the claims; hence, it would not be proper to reject the claims on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection under 35 U.S.C. 103 should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims.**

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1 and 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makimoto (US/6,830,958) in view of Igarashi et al. (US/6,780,676).

Re claim 1, Makimoto discloses a method for producing encapsulated chips, comprising: preparing wafer with contacts projecting from a surface of the wafer (i.e., connecting electro pads on the semiconductor wafer, see Col. 4, lines 4-15); arranging the wafer on a dicing substrate (i.e., dicing sheet **8a 8b**) (see Fig. 2(b)); dicing the wafer to generate a plurality of chips (see Fig. 2(b)) spaced from each other via trenches (see Fig. 2(b) and Col. 4, lines 21-28) on the dicing substrate; conducting transfer molding to introduce an encapsulation material (4) (see Fig. 2(c)) between the contacts and into the trenches, whereby the chips arranged on the dicing substrate (8a) are encapsulated (see Fig. 2(c)); and creating a redistribution structure (i.e.,

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bumps) (5) of an electrically conductive material on a portion formed by the encapsulation material (see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50).

Although Makimoto discloses transfer molding to introduce an encapsulation material, which one of conventional molding process, Makimoto does not specifically disclose other conventional molding process of injection molding.

Igarashi et al. disclose conventional method of injection molding in order to inject a resin material (13) and encapsulate the semiconductor chip (see Figs. 7-9). As Igarashi et al. disclose injection molding as well as transfer molding process is preferable because it is convenient (preferable) for the mass production to form an encapsulated IC chips (see Igarashi et al. Col. 7, lines 35-40).

One of ordinary skill in the art would have been motivated to use alternative process of injection molding to encapsulate the IC chip for mass production purpose.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to provide Makimoto reference with conducting injection molding to introduce an encapsulation material as taught by Igarashi et al. because injection molding convenient for mass production during encapsulation of the IC chips.

Re claims 8 and 9, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein the step of dicing further comprises enlarging a distance between the chips on the dicing substrate by means of a treatment of the dicing substrate (i.e., by stretching the dicing substrate) for enlarging the surface of the dicing substrate (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 10, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the step of producing a redistribution contact projecting from the redistribution structure (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 11, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein functional structures are formed in the step of injection molding (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 12, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein the functional structure is selected from the group including a recess, a V-notch, and a protrusion (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 13, as applied to claim 12 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein the protrusion is formed in the step of injection molding, the method further including the step of applying an electrically conductive layer to the protrusion for forming an electrical contact (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 14, as applied to claim 11 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein the functional structure includes an adjustment marking (i.e., alignment mark), a structure for assembly assistance, or a structure for arranging an optical guide (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 15, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the step of creating a via (see Fig. 2(e)) in the encapsulation material (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 16, as applied to claim 15 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein the step of creating a via comprises the step of arranging an electrically conductive pin in the trenches so that the pin is lined by the encapsulation material in the step of injection molding (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 17, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein another redistribution structure in addition to the one redistribution structure is provided on a second surface of the wafer, which opposes the surface on which the contacts are formed (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

Re claim 18, as applied to claim 1 above, Makimoto and Igarashi et al. disclose all the claimed limitations including the limitation wherein functional units are assembled on the surface of the wafer prior to encapsulating (see Makimoto see Figs. 2(a) – 3 and related text in Col. 3, line 30 through 6, line 50 and Igarashi et al. Col. 7, lines 35-40).

***Allowable Subject Matter***

8. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 3, 4, 6 and 7 also objected being dependent of the objected base



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claim, and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Liu (US 2002/0123210) also discloses similar inventive subject matter.

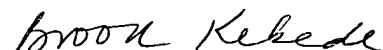
***Correspondence***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (571) 272-1862. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brook Kebede  
Patent Examiner  
Art Unit 2823



BK  
April 1, 2005